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ABSTRACT

This study was designed to reveal the differences in patterns of motivational variables and factors, and their differential effects upon academic achievement of Chinese and Puerto Rican early-grade school children. To determine the motivation and achievement levels, 198 subjects, with 99 in each group, were selected and tested by three motivational scales, Gumpgookies, Test Anxiety, and Achievement Responsibility Questionnaire, and an achievement test. Motivational patterns on the three scales and on the five factors in Gumpgookies were analyzed between cultures. The motivation-achievement relationship was also obtained by multiple regression analysis. The cross-cultural findings in this study showed that different cultures did provide differential impacts upon the development of achievement motives as well as upon the association patterns between motivation and performance. (Author)

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THE RELATIONSHIP BETWEEN MOTIVATIONAL PATTERNS AND ACADEMIC ACHIEVEMENT IN MINORITY GROUP CHILDREN

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CHAPTER I

Introduction

The significance of Coleman's report on Equality of Educational Opportunity (Coleman, 1966) has been recognized by the American public. Parellel with the heightened awareness and concern of the inequality of the educational outcomes existing among different ethnic groups is the increased interest in research on the problems of learning inefficiency of the so-called 'disadvantaged' children. In most analytical studies on achievement syndromes in students from 'depressed' areas, the characteristic deficiencies in achievement motivation is usually assumed to be the critical cause of their academic failure (Allen, 1967). In fact, an impressive body of research has been devoted to search for determinants of academic striving in children from different ethnic backgrounds. For the last decade, systematic efforts have been made in studying the cultural influences on the development of different achievement-related motives. For instance, one group of studies investigated the various aspects of 'motivation to achieve'(Rosen, 1956,1959; McClelland, 1953,1955,1958; Atkinson, 1958,1960; De Charm, 1955, 1969; Heckhausen, 1967,1968; Adkins & Ballif, 1968,1970a,1970b; Mingione, 1965,1968; Maehr & Sjogren, 1971). Another group dealt with 'locus of control' variable (Bialer, 1961; Battle & Rotter, 1963; Crandall, 1960,1962,1965,1969; Rotter, 1966; Lefcourt, 1966; Katz, 1967a,1967b). Still another group addressed themselves to the topic of 'anxiety' (Palermo, 1959; Sarason, 1958,1960,1964; Cowen, 1965,1967; Phillips, 1966; Feld, 1967,1969). This bulk of empirical evidence is sufficient, however, to substantiate certain postulates in some theories, yet much more are needed to be done to advance the theoretical generalization and refinement. The investigation of the presumed relationship of achievement motivation with socialization process on the one hand and with academic competence on the other has gained much currency in the motivational research. But, still, very little has been done in these areas cross-culturally. To view the learning problems of the minority group students in the light of evolving theories of motivation is badly called for. The narrowing of the existing achievement gap among different racial groups depends much upon the understanding of the functions of academic motivation which mediate between the social systems and behavioral patterns. Through this understanding, the cause-and-effect relationship between the inequality of achievement levels and the variation of cultural influences will be explicated.

Accordingly, the present study is conducted based on two assumptions: (1) in different cultural settings, different motives are fostered, and (2) within each culture, each of these motives will associate in different

degrees with scholastic performance. The analysis of the motivational patterns and their influences upon academic achievement in students of two minority groups (Chinese and Puerto Rican) will be of centrol interest of the study.

Statement of the Problem

The purpose of the study is to reveal differences in patterns of motivational variables and factors, and the differential effect of these variables and factors as determinants of academic achievement of early-grade school children of similar demographic background in two different cultural groups in New York City.

More specifically, the study seeks to test the following null-hypotheses:

1. (a) There are no significant differences between the two groups in the patterns of scores on measures of three motivational variables.
   (b) There are no significant differences between the two groups in the patterns of scores on measures of the five sub-scale factors in Gumpgookies.
2. (a) There are no significant differences between boys and girls within each group in the pattern of scores from the three major motivational variables.
   (b) There are no significant differences between boys and girls within each group in the pattern of scores from the five sub-scale factors in Gumpgookies.
3. (a) There is no significant relationship between the three major motivational variables and the academic performance within each group.
   (b) There is no dignificant relationship between the five sub-scale factors in Gumpgookies and the academic performance within each group.
4. (a) There is no significant differences on each β of the three motivational variables as predicters in the multiple regression equation computed for each group.
   (b) There is no significant differences on each β of the five sub-scale factors as predictors in the multiple regression equation computed for each group.
5. (a) There is no significant difference on the degree of predictive efficiency for the two regression equations (both based on the three motivational variables to predict academic achievement) computed for the two cultural groups.

(b) There is no significant difference on the degree of predictive efficiency for the two regression equations (both based on the five sub-scale factors to predict academic achievement) computed the two cultural groups.

Significance of the Problem

Mativational determinants in minority group children. Despite the extensive literature on motivational research, only a very small number of works have been published employing Chinese American or Puerto Rican as research subjects. With the exception of a few studies involving nation-wide samples (Coleman, 1966; Adkins & Ballif, 1968 & 1970) which included students from all ethnic backgrounds, there is virtually no information concerning motivational experiences of these two types of students. Even though several recent studies (Mingione on 'n-ach', 1966 & 1968; Bolger el al on 'anxiety', 1967; Zirkel & Moses on 'self-concept', 1971) reported findings on motivational expressions of students from these two cultural settings, the obtained data are neither convincing nor complete. With the lack of substantial empirical knowledge motivational constructs, any educational decision attempting to enhance the academic striving will continue to rest more upon personal conjecture than the results of scientific research. If the role of education is to bring forth academic progress in students of all cultural origins, there is a practical need to explore the motivational dynamics that govern their efforts to achieve. Not only can analysis of the motivational determinants bear important meaning to the groups concerned, but also elaborate productive implications on the complex problems of urban education in the multi-ethnic environment.

c Cross-cultural study of motivational patterns. In congruence with the traditional values, reward systems, and educational expectancies, each culture selects for emphasis only a few of the pertinent motives that can activate the achieving efforts in the academic area. Thus, the generalization of the findings of a motivational study fromone cultural group to another calls for supporting evidence from cross-cultural research. In order to have a wider view of the motivational behavior evolved and a larger scope of its influence unfolded, the investigations of achievement motivation in many different cultural settings is essential.

Whether the studies consider the different ethnic backgrounds as conditions provided with widely divergent characteristics (Rosen, 1956; Battle & Rotter, 1966; Cowen,et al.,1967) or stress situations consisting of systematic covariant factors (Sarnoff et al., 1959; McClellend, 1965; De Charms & Carpenter, 1969) the outcomes generated from such studies contribute to a penetration of the conception of human motivation. Until recently,however,

not many analyses of motivation have taken this problem on their focus of study of motivation-achievement relationship within the cross-cultural context. Few of the relevant studies tried to extend the theoretical framework of achiva motivation from univariate or bivariate to multivariate design so that very little has yet been discovered about thedifferences in patterns of motivation across cultures. Still few research studies have gone beyond the contrast of whites with Negroes, and hence the discussion of motivational patterns other than these two cultures is theoretically impossible. It is much more meaningful to have an integral view of the patterns of motivation to which the differential socialization forces refer and the important motivation-achievement relationship is also related. When this knowledge is available, the understanding of the motivational construct as a psychological function can be advanced and the theories of motivation can be evaluated with greater scientific precision and significance.

Implication for teaching and counseling. One of the basic problems persistently confronting most teachers and counselors of the culturally-deprived students is: What available techniques can be drawn from the body of motivational research and applied directly to promoting their motivation to achieve? Requisit for any possible solution is the search of valid information regarding the motivational patterns implicitly influencing their achieving behavior. Some empirical evidence accumulated in this area has been used beneficially in the service of teaching and counseling practice with children from the typical middle-class, white population, but the serious lack of experimental data on motivational variables in students from widely dissimilar cultural groups restrains not only the refinement of the teaching technology and also the unmistakable application of the theoretical model across cultures. It is noteworthy from theresearch data dealing with Negro students that a unique interpretation has been empirically derived regarding their spuriously high educational aspirations (Rosen, 1956; Katz, 1968), deep-rooted anxiety experiences (Katz, 1967), and the weak self-concept (Poussaint and Atkinson, 1968). Similarly, research is needed in cultural groups other than whites and Negroes in order to provide valid interpretations of their psychological dispositions in areas such as test anxiety, aspiration level, locus of personal control, and strength of achievement motivation. Further information is needed to determine the similarities and differences in terms of the structure of motivation within each cultural group and in comparison with other cultures. These areas will remain unanswered until comparative studies are conducted to disclose the cultural differences in motivational patterns. With this disclosure, the appropriate manipulation of the operational effects of the motivational variables and the

derivation of effective techniques to improve classroom learning and adjustment will become possible.

Related Research

Predominant motivational variables in current multi-dimensional theories of motivation. Dominating the preceding research on motivation, there are three important variables: "motive to achieve success", "motive to avoid failure", and "internal-external control". The persons respectively responsible for the large part in formulating these ideas are D. C. McCelland (1953), S. B. Sarason (1958), and J. B. Rotter (1963). The discussion of these variables and their relationship to achievement behavior was first seen in Atkinson's (1960a, 1960b) three-factor model of achievement motivation which attempted to determine the multiplicative function of "success probability", "incentive value", and "achievement-oriented motive" or "failure-threatened motive". The internal-external control dimension of Atkinson's model was investigated in De Charm's (1965) work on internal determinants of behavior and Feather's (1967) experiment on the preceived locus of control. In a research project oriented by Atkinson's motivational model and Rotter's social learning theory, six predictor variables were identified by Crandall, Katkovsky, and Preston (1962) as motivational determinants of achievement behavior in young children. Of these six motivational determinants, the three dominant variables shared predictive function and the internal-external control of reinforcement responsibility was found the best predictor of their intellectual achievement performance. Looking for a self-regulated model of achievement motivation, Katz (1967) focused his study on two particular elements : the internal-ization of excellent standard and the self-evaluative response as achievement reinforcement together with test anxiety and achievement responsibility control variables in order to analyze the motivation construct of Negro students on the basis of anxiety-reduction mechanism suggested by Aronfreed (1964). In research on motivation to achieve from the preschool youngsters, Adkins and Ballif (1968) proposed a five-factor model which tended to view the motivational construct as a cluster of covert responses inferrable from achievement-oriented behavior. In these five types of covert responses some elements of the three dominant motives were also embedded. The inclusion of these three predominant variables as attitude measures toward academic motivation in large-scale research was found in Coleman's (1966) survey and in Michigan Unversity longitudinal project (1968). Heckhausen (1968), in a review of current achievement motive research, recognized these three dominant variables as "more of less stable dispositions" with relation to achievement performance. Smith (1969), in editing a book entitled Achievement-Related Motives in Children, considered the same three variables as the "three major traditions of research on these topics" and the three main themes of discussion in most motivational studies. Katz (1969), after years of

research on Negro's academic motivation, concluded :

> The concept of a single global achievement motive has to be abandoned in favor of a notion of many relatively independent achievement motives that are specific to particular areas of competition.

Therefore, the adaptation of the multidimensional approach and the selection of the three motivational variables for the present study is in accordance to the empirical emphasis and the current tendency.

Ethnic-cultural differences in the three predominant achievement motives. McCelland and his associates (1952) first explored the cultural difference in n-Ach by analyzing folktales on the basis of n-Ach scoring key in a cross-cultural study in which they found the American students had higher n-Ach level than the Germany and British students. The Negro-white difference in TAT, Thematic Apperception Test, scores was found significant by Rosen (1959), Merbaum (1962), and Littig (1968). Mingione (1965, 1968) obtained results based on TAT which, though not significant, were in the predictive direction among white, Negro, and Puerto Rican. In studies of young children by Adkins and Ballif (1968), differences in Gumpgookies total scores and in patterns of subscale factors among ten ethnic groups were found consistent with the hypothesis on cultural effect upon the levels of motivation of achieve.

In terms of internal-external control variable as determined by Rotter's scale, Graves (1961) demonstrated cultural difference by indicating that the whites were the most internal group, followed by Spanish-Americans, and then Indians. Significantly higher internal levels in white than in Negro samples were reported by Titus (1966), Lefcourt and Ladwig (1965, 1966), and Coleman (1966). With the children samples, the similar Negro-white difference was discovered by Battle and Rotter (1963) based on a measure called Childrens' Picture Test of Internal-external Control even though the comparative study on cultural difference was not available with the measure, Intellectual Achievement Responsibility Questionnaire (IAR), which was developed by Crandall and her cowrokers.

In terms of anxiety level as measured by the Test Anxiety Scale for Children (TASC), that the British children scored significantly higher than the Americans was shown as hypothetized by Sarnoff, Lighthall, Waite, Davidson and Sarason (1958) owing to the streaming system in British education. The Negro-white difference with higher test anxiety level in the Negro group was obtained by Epps (1966) and Phillips (1966). In the second grade poplation, Feld and Lewis (1969) found that the Negroes had higher test scores not only on the total scale but also on each of four sub-scales: test anxiety, remote school concern, poor self-evaluation, and anxiety somatic signs.

Thus, the evidence just cited has provided substantial base in studying the motivational pattern based on the three motivational variables or the five sub-scale factors in Gumpgookies among different cultural or ethnic groups.

Correlation of motivational variables and academic achievement. Significant relationship of n-Ach measures to various kinds of academic tasks was reported by McCelland and Liberman (1949), Lowell (1952), Reitman (1954), Wendt (1955), French (1955, 1958), Atkinson, Bastian, Earl, and Litwin (1960), and Mcheachie (1961). However, another group of studies as tallied by Klinger (1966) yielded conflicting results, indicating no significant relationship between n-Ach and criterion measures. Based on the available data, the pattern of confirmation or disconfirmation of the motivational feature of n-Ach is neither clear nor definite. With the children samples, none of the reported studies ever reached statistical significance regarding the correlation between n-Ach and achievement activities. On the other hand, Gumpgookies, an instrument developed to measure the similar construct as defined by n-Ach, was found significantly differentiating the high- and low-motivation groups as ranked by teachers. (Adkins and Ballif, 1970; Asuzano,1971). Modest significant correlations were also reported between Gumpgookies and several achievement and intelligence measures for fairly homogeneous age groups.

The negative relationship of test anxiety to academic competence was first found significant by Sarason,and his associates (1958) and then reported consistently by Doris (1959), Morgan and Rosenberg (1960), Lunneberg (1964), and Hill and Sarason (1966). When the effect of n-Ach and test anxiety was jointly considered to affect the level of school performance, test anxiety usually held stronger relationship with achievement criteria of the two motive variables and little or no association with n-Ach.(Atkinson and Litwin, 1960; G. Sarason, 1963; Feather, 1965; Weiner, 1966). In general, TASC scores are somewhat more dependably related to academic achievement than are CMAS scores (Lunneberg, 1966; Klinger, 1969). Furthermore, test anxiety scale is believed to be less influenced by the defensive mechanism (Sarason, Lighthall, Davidson, Waite, and Ruebush, 1960) and more associated with achievement-related experience in the academic striving (Katz, 1967; Feld and Lewis,1969).

Positive relationship between internality and academic value and efforts based on Rotter's I-E control scale was idenitified by Seeman (1963), Franklin (1963), Rotter and Mulry,(1965), and Seeman (1967). When the elementary school children were concerned, intelligence levels and learning skills were likewise found to be related to the preceived internal control as determined by IAR scale by Crandall (1962). One of the good characteristics of IAR test is its sole concern with the achievement-related influence, precluding any fate-control attitudes.

With Negro population, Vocabulary Test scores were found significantly correlated with n-Ach levels for the North Negroes but not the South sample in Nuttall's (1964) study. The research on the relation of vocabulary ability to test anxiety by Epps (1969) yielded significant results for both North and South Negroes. With respect to the Negro-white comparison of the relation pattern, Rosen (1956) found the n-Ach scores were more predictive of grade levels of white adolesents than Negroes. The studies by Lefcourt (1965) revealed the external control results obtained by the Negro adults were more prone to associate their unrealistic goal-setting behavior than whites. The data of these correlational studies were consistent with Coleman's (1966) findings that the sense of control variable accounted for about three times as much variance in achievement test scores of Negroes as of whites. Katz's (1967) evidence on anxiety-reduction research likewise lent support to the higher relationship on test anxiety and striving effort found among Negro boys than whites. Although limited, what is known about Negro-white differences in relation patterns between motivation and achievement variables is sufficiently promising to warrant the expansion of the experimental work to other minority children.

Limitations of the Study

Variability of I. Q. levels. The first source of limitation comes directly from the related variable which has not been controlled through the experimental design. As indicated in most motivational studies, the partialling out of students I. Q. will help to purify the genuine motivation-achievement relationship between groups of children. Unfortunately, however, the permission for administering I. Q. measures to students in New York City cannot be obtained from educational authorities. The intelligence levels of the sampled students in the present study must be regarded as essentially uncontrolled. Hopefully, it will be randomly distributed.

Sub-scale factors in Gumpgookies. One source of limitation comes from the five sub-scales in Gumpgookies which are considered five independent motivational factors in this study. Despite the fact that clearly interpretable factors have been extracted and the corresponding items identified from a national sample of preschool and school-age students, certain factors carry comparatively fewer items or weaker factor-loading than other factors. Based on Spearman-Brown formula, the factor with fewer items will have lower reliability that will in return limit the predictive validity when related to the academic achievement. It is hoped that the regression weigth assigned to each item and the normalized procedure applied to each set of factor score will help remove this limitation.

Translation fidelity in IAR and TASC scales. Another source of limitation stems from the translation of the measuring instruments into source languages. Considering the different language dominance of the sampled students and attempting to make the test responses comparable, translation into source languages was done for the two instruments, IAR and TASC, which are heavily loaded with verbal content. Nevertheless, no perfect translation fidelity can be expected in testing instruments to be adapted in cross-cultural studies. The discrepancies in language translation will inevitably occur. It is hoped that extra effort and caution devoted to the test translation and the bilingual administration of the scales will minimize these undesirable discrepancies.

CHAPTER II

Method

Subjects

The total sample is defined to include 351 second- and third-grade students distributed in three public schools for the year 1970-1971. These three schools spread like a triangle in the lower-east Manhattan, each situated within a distance of two long city blocks from the other. The community where the sample was drawn has been shown (New York City Housing Authority, Project Satatistics, June, 1962) to be occupied predominantly by lower-income families which constitute the major population residing in the poor condition of the apartment houses and low-income housing projects around this area. The student statistics shown in the Community School District records indicate the ethnic breakdown of the total population in these three school is as follows : 51% Chinese, 40% Puerto Rican, and 9% Negro and others.

TABLE 1
Total Sample Distribution According to School,,Class, and Grade Level

School	Grade Level	Number of Classes	Number of Children
A	2nd	3	79
B	2nd	2	49
C	2nd	3	87
B	3rd	2	56
C	3rd	3	80
TOTAL		13	351

As shown in Table 1, the 351 pupils in the total sample were those drawn from thirteen classes of middle-level achievement in two elementary grade levels and also those participating in the testing program purposely prepared for this study. From this sample, around 9% of students with ethnic origins other than Chinese and Puerto Rican were first eliminated. Subjects (around 17%) who were absent in any one sitting from the testing program, not completing any test papers, identified as non-English or non-responding pupils, or judged as systematically cheating in the testing situations were also excluded from the initial sample.

The final sample was comprised of 198 pupils (56.4% of the original sample), with 99 in each cultural group.

These two groups of students were finally selected by matching on the following criteria : sex, grade, age, school experience, language used in the home, birthplace, and birthplace of parent. Appendix A shows tables for the breakdown of the two subsamples, Chinese and Puerto Rican, in terms of the criterion variables. With this matching procedure, these background characteristics for the two groups were assumed to be under methodological control.

An inspection of all tabulated values immediately tells that the two cultural groups were matched fairly successfully on sex, age, school experience in United States, birthplace of parents, and language used in the home; though a little less desirably on birthplace of the child. It is well recognized, however, that matching two groups of students on more than four or five variables, small discrepancies happening on one or two variables are inevitable. The increasing influx of Chinese immigrants in the last few years, for example, magnified the number of non-American born Chinese children and precluded a completely comparable matching of the two groups in this criterion. Considering the close match on most important criteria such as sex, age, school experience, etc., the two sub-groups selected for the present study can be deemed as fairly comparable with respect to the overall pattern of the background characteristics. Thus, the final sample for this study is composed of two cultural groups, each with 99 pupils, having similar characteristics concerning their demographic and linguistic background.

Materials

Gumpgookies. This instrument is designed to measure motivation to achieve in children of age 4 through 9. For this study the 75-item group-administered form was used. The construction of the test was based on the objective-projective technique that requires a choice between two alternatives portrayed in pictures and accompanying verbal descriptions. The test items were presented in a story format, each depicting two small imaginary figures called gumpgookies in a semi-structured situation with dichotomous options. The purpose of the test was to reveal the strength of the five types of covert responses hypothesized by the authors to be the constituents of motivation to achieve success in the school setting. The tester read the verbal descriptions going with each item and the children were asked to choose the gumpgookie which in each situation they projected themselves to be. The score was decided by the number of motivation-oriented responses chosen by the child.

The computer program developed for generating factor scores from test responses was applied to compute the five sub-scale scores for each subject. This program was efficient to assign regression weights to each item, zero

out response set influence, and finally produce scores of five factors in terms of standardized 'T' score from (mean= 50, standard deviation=10). Since the factorization was done on children from 10 different ethnic-cultural backgrounds, the five extracted factors could be reasonably expected to have high degree of cultural generality. The results of these factor-analytic studies apparently substantiated the hypothetical structure of the five factors and contributed to the construct validity of the instrument. The KR-20 estimates of reliability for the total test score on Gumpgookies were in the neighborhood of .85 to .90 and for the five factors were ranging from .35 to .55. Test-retest reliability obtained from first- and second-graders was around .65. Reported correlations with intelligence and achievement measures ranged from .20 to .35.

The Intellectual Achievement Responsibility Questionnaires. (IAR) This instrument is devised to measure a child's belief in internal-versus-external reinforcement responsibility for the consequence of performance in the intellectual-academic situations in which the significant others such as parents, teachers, or peers are usually involved. The test consists of 34 force-choice items, the stem of which describing either a positive or a negative achievement experience and followed by two alternatives concerning internal or external control of the academic event. The internal alternative chosen for a positive event item is designated by I+ and the internal alternative chosen for a negative event item, by I-. The total score computed by summing the number of I+ and I- will reflect one's level of internal belief. The tester read both the item stem and the alternatives for each item and the children were required to choose one alternative which they thought best described what really happened to them. Test-retest reliability obtained after a two-month interval was .69. Split-half reliabilities ranged from .54 to .57. The relationship with intellectual achievement activities such as free play,. Stanford-Binet intelligence test, and Reading and Arithmetic test, as determined by correlation coefficie coefficients, were moderate for young boys, and negligible for young girls.

Test Anxiety Scale for Children (TASC) This instrument is a 30-item questionnaire designed to measure anxiety reactions which occur in test situations. It is also a measure usually used to assess the strength of avoident tendency or motive to avoid failure by Atkinson's group. The questions concerned chiefly a child's conscious unpleasant experiences such as uneasiness, worry, emotional interference and heartbeat acceleration happening both before and during the examinations on school courses. The dichotomous responses, "yes" or "no", chosen as an answer to each item represented the presence or absence of the unpleasant state of affair described in each question. All the questions were read to the children and they were

asked to circle "yes" or "no" to each item so as to express their real feeling or thought about each situation. The sum of "yes" responses yielded to a total score reflecting the test anxiety level of a child. Its test-retest reliability coefficients ranged from .65 to .82, and the split-half reliabilities were from .69 to .81. The relationship with intellectual achievement measures was consistently negative and in the neighborhood of .29 to .30.

The Metropolitan Achievement Tests (MAT) The primary II Battery and the Elementary Battery (both form F) of the entire series were used respectively with students from grade two and three. Each battery consists of a number of subtests, measuring principally the important reading skills and comprehension and the fundamental concepts and skills in arithmetic. The results of these two academic areas, reading and arithmetic, were used as dependent variables in this study and the scores of these two abilities were separately computed for each subject in the two cultural groups. The administration of the tests was done following the directions in the Manual. The batteries are commercially available tests, published by Harcourt, Brace & World, Inc. High reliability and validity coefficients were reported.

Procedures

Translation of IAR and TASC. To ensure the comprehension of the two verbally-loaded scales, IAR and TASC, it was decided that oral administrations of the same were to be done in bilingual procedures. This, of course, necessitated the translation of these two scales into source languages, Chinese and Spanish. The Chinese translation was initially done by the investigator and the Spanish versions were completed by Mr. Luis Rivera, a Puerto Rican student working toward an Ph. D. degree in the field of education. Upon completion of the translation in both languages, the translated materials were verified and corrected by three competent bilingual teachers who worked regularly in schools as translators in either of the two languages. Therefore, the final form of the translation was the joint product of all these individuals who had devoted their utmost effort to keep the translated materials equivalent both in context and in expression to the original scales.

Initial steps for the testing program. After obtaining approval for the study from the Board of Education and the Community District Office, a series of meetings were immediately conducted with the principals and the responsible personned in the participating schools to make arrangements for data collection. Classes were selected in each grade level on the basis of the achievement performance of the students and the balance in ethnic breakdown for the two cultural groups. Upon agreement with the school authorities on the testing schedule, an overall plan of the testing program (see Apprendix B) was developed by the investigator and distributed to all individuals concerned

covering a detail explanation of the purposes, functions, and procedures of the testing. Following this one meeting was held with the participating teachers in each school to further clarify certain points in the plan and also the role of tester which the teachers had to fill in administering the MAT batteries.

Two student teachers, one Chinese and one Puerto Rican, were contacted and trained by the investigator to give the IAR and TASC bilingually. Agreement to administer Gumpgookies was also obtained from an experienced tester who had assisted in the validation studies of the same test. Thus, a team of testers was set up as planned with an experienced worker on Gumpgookies and two trained college students with bilingual capacity.

Collection of test data. The testing program was implemented simultaniously in three participating schools. The administration of the three motivational measures was scheduled in the third week of June, 1971, and the following week for the MAT batteries. In attempt to standardize the bilingual administration of IAR and TASC, the homogeneous grouping of students of the same cultural background was desperately desired. And this was achieved in all three schools when IAR and TASC were given. Students of the same ethnic origins were grouped together and tested bilingually by a tester of the same race. When the Gumpgookies and MAT were administered, the classes were kept integrated as they had been originally and only English was allowed in the testing.

Oral directions and reading of test items were the main features during the administration of all measurements. Within each testing session, a proctor was present to assist the tester in distributing and collecting test materials, identifying non-responding subjects and trouble-making students.

Gumpgookies was given on a group basis. Colorful test booklets were distributed to the subjects. The tester read the verbal description accompanying each item in a rhythmical manner and the children followed while marking their responses.

The two scales, IAR and TASC, were administered in similar procedures. The students were provided with answer sheets. In the case of TASC, only "Yes" and "No" alternatives were printed next to the number of the corresp corresponding questionnaire item. For IAR scale, the number and the two alternatives were printed for each item without the item stems. The tester read each item aloud in two languages (English and source languages), and then paused to permit the subjects to encircle or underline an alternative for the appropriate number on the answer sheet.

MAT batteries were given by the teachers to their own classes. Sufficient number of test booklets were prepared and handed to the teachers a week before the testing. The

administering procedures were carried out strictly according to the specifications written in the direction manual.

Collection of demographic data. A week later, permission was given to the investigator to collect information on sex, age, school experience, language used in the home, etc. from the cumulative folders and records maintained by the schools or teachers for each pupil. This information was used later as criterion variables for matching students in the two cultural groups.

Statistical analysis

Pertinent to the two assumptions postulated in this study, the data analysis was to be processed also in two stages: (1) the determination of the motivational patterns between the two groups, and (2) the determination of the relative contribution of the motivational variables and factors in predicting the academic achievement within and between the two subsamples.

To determine the difference in motivational patterns, the multivariate model for profile analysis suggested by Morrison (1967) was adapted for the comparison of two independent groups. This model yielded three statistical T^2 values for the testing of three hypotheses respectively: the parallelism or the interaction effect, the level effect, and the measure effect between patterns. If the hypothesis on parallelism was rejected, the multivariate test of significance based on T^2 would be used in determining the mean difference on the set of variables. If the null-hypotheses on the difference in the main effects were rejected, multiple comparisons or post hoc contrasts on mean differences suggested also by Morrison (1967) were employed to locate the variables which contributed to make the patterns differ.

To determine the relative degree of relationship between motivational variables and academic achievement as assessed by MAT, the computation of intercorrelation matrix based on Pearson r's and the development of multiple regression coefficient provided and initial step in a series of analyses. The difference in predictive efficiency among predictor variables was determined by the stepwise F value for each predictor added to the multiple regression model and also by the B coefficients generated from the multiple regression equation. The computer program adopted for the multiple regression analysis in this study was based on stepwise forward-selection procedure which availed examination at each stage of the regression of the predictor variables incorporated in the model by formulating the stepwise partial F test, and also the determination of significance of each Beta weights in the regression via student t value. The final step attempted to determine the homogeneity of regression by way of the multivariate model proposed by Wilson & Carry (1969). More specifically, this model was to test the difference

of regression weights or the residual sum of squares derived thereby between the two regression planes computed from two independent groups using the same set of variables. The acceptance of the hypothesis on homogeneity of regression in terms of likelihood-ratio test simply means the parallelism of the two regression planes.

The statistical design, thus formulated, placed ample emphasis on the multivariate approach, in terms of pattern analysis as well as regression analysis, toward the multidimensional aspect of the motivational construct. It must also be noted that the statistical analysis was performed not only with the three main motivational variables but also with the five sub-scale factors in Gumpgookies. Differences for sexes as reflected in the pattern analysis of motivational variables and factors was also investigated.

CHAPTER III

Results and Discussion

Pattern analysis

The statistical model used for pattern analysis suggests to solve three related problems: (1) the parallelism of the pattern shapes, (2) the level of the pattern means, and (3) the equivalence of the measure means, which are also treated as interaction effect, level effect, and measure effect in pattern analysis technique. Therefore, the differences in pattern of responses between groups are eventually determined by the analysis results corresponding to the three main effects.

Prior to the beginning of comparisons, the individual scores on all measures were transferred into standard scores. This was done through the normalized procedure across the total sample of 198 students in order to obtain equal units among variables. Examination was made on the homogeneity of covariance matrices derived from the two subsamples by using Bartlett's formula. Neither the observation based on the three motivational variables (X^2=8.33, df=6) nor on the five factors in Gumpgookies (X^2=20.22, df=15) yielded significant chi-square value, and as a result the assumption of homogeneity of variance between populations was tenable and the pooling of within-group variance was also justified for both observations.

Group influence on motivational patterns based on three variables. The results reported here concern the first null-hypothesis which assumed no cultural difference in the patterns of scores from the three motivational measures. Table 2 presents the group means and standard deviations on both normalized and raw scores for the three scales. Figure 1 and Tables 3 to 5 contain the analysis results of the main effects and the post hoc contrasts.

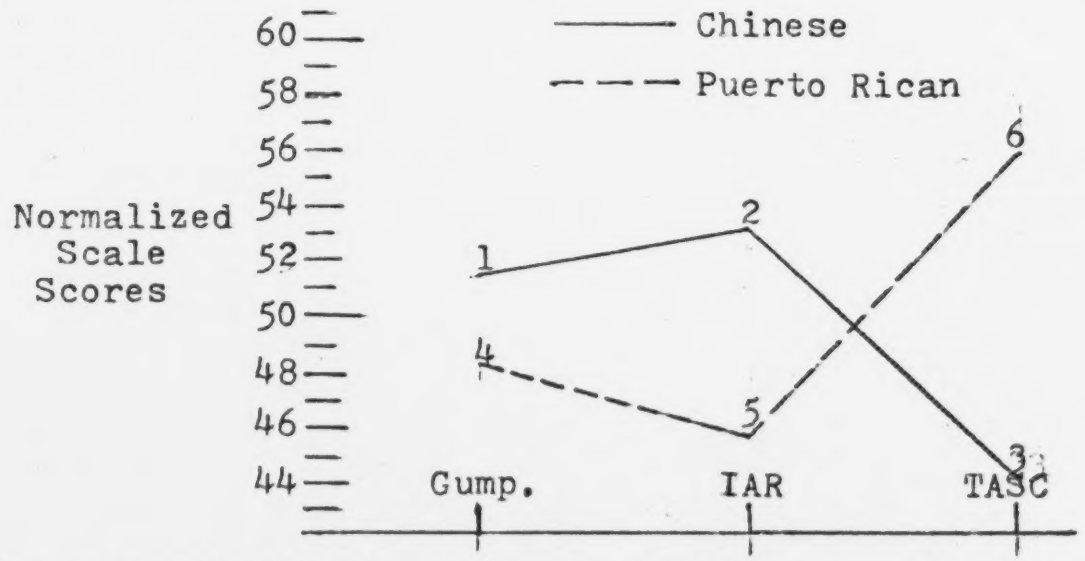

Figure 1-Pattern of motivational scale scores for each cultural group.

TABLE 2

Means, Standard Deviations and Ns of Normalized and Raw Scores for Gumpgookies, IAR and TASC Scales on Chinese and Puerto Rican Samples

Scale	Chinese Normalized Score			Puerto Rican Normalized Score		
	N	Mean	SD	N	Mean	SD
Gump.	99	51.45	10.44	99	48.54	9.30
IAR	99	53.41	10.02	99	46.58	8.73
TASC	99	44.28	7.42	99	55.71	8.92
	Raw Score			Raw Score		
Gump.	99	65.95	8.46	99	63.61	7.54
IAR	99	20.21	4.13	99	17.40	3.60
TASC	99	6.48	5.40	99	14.75	6.48

TABLE 3

Test of Group Effect upon Pattern Parallelism based on Gump. IAR and TASC Scales for Chinese & Puerto Rican Samples

Source of Variation	d.f.	T^2	F	P
Pattern Parallelism	2/195	123.98	61.62	.01
Post hoc Contrasts			Confidence Intervals	
1 - 2 v.s. 4 - 5			-10.79 -	2.93
2 - 3 v.s. 5 - 6			11.84 -	24.69*

TABLE 4

Test of Group Effect upon Pattern Levels based on Gump. IAR and TASC Scales for Chinese and Puerto Rican Samples

Source of Variation	d.f.	T^2	F	P
Pattern Levels	3/194	132.07	43.57	.01
Post hoc Contrasts			Confidence Intervals	
1 v.s. 4			-8.26 -	2.44
2 v.s. 5			1.75 -	11.91*
3 v.s. 6			-15.86 -	-7.00*

TABLE 5

Test of Difference in Measure Means among Gump., IAR and TASC Scales within Chinese and Puerto Rican Sample

Source of Variation		d.f.	T^2	F	P
Measure Effect in					
Chinese Group		3/96	60.01	30.19	.01
Puerto Rican Group		3/96	63.27	31.31	.01
	Post hoc Contrasts		Confidence Intervals		
Chinese Group	1 v.s. 2		-3.64	-	-0.28*
	1 v.s. 3		5.54	-	8.80*
	2 v.s. 3		7.55	-	10.71*
Puerto Rican Group	4 v.s. 5		0.35	-	3.57*
	4 v.s. 6		-5.39	-	-8.95*
	5 v.s. 6		-7.76	-	-10.50*

* indicates significant from zero difference at .01 level.

The T-square value on parallelism was highly significant and the hypothesis of parallel patterns between groups was rejected. Further analysis through post hoc contrasts indicated that marked difference was found in the comparison of the line segment of the two adjacent tests, IAR and TASC. The salient interaction of these two tests across cultural groups seemed to constitute the biggest portion of variance of any other contrasts responsible for the non-parallelism of the score patterns. The different characteristics classifying Chinese and Puerto Rican groups did show differential effects upon the development of a achievement motives and differentiate the patterns of motivation based on the three variables. Research emphasizing the functional relationship between sociocultural influence and motivation development (Rosen, 1959; Katz, 1967; Pareek, 1967) received further supporting evidence from the present data.

Because of the pattern interaction effect, the difference in mean level of the three variables between Chinese and Puerto Rican groups was determined by using multivatiate tests of significance. The obtained T-square far exceeded the tabled value for significance at .01 level and led to strong rejection of the hypothesis of equal level between the two sets of variable means. The post hoc constrasts disclosed that the two cultural groups differed remarkably in IAR and TASC mean levels even though the direction of difference for these two variables was in reverse. This provided evidence that the different cultural conditions in Chinese and Puerto Rican samples did have

definite effect to affect the absolute level of each of the three variables, and the effect seemed to be greater in anxiety and I-E responsibility control measures.

The non-parallelism of patterns required also the hypothesis of equal measure means to be tested separately within each cultural group. As shown in Table 5, the two T-square values computed on measure effect for Chinese and Puerto Rican subsamples were both significant beyond .01 level. The post hoc contrast procedure located the significant differences in measure means from all six pairs of comparisons. Thus, in addition to the difference in score patterns, in levels between sets of variables, each motivational variable developed differed in strength from another in a particular culture depending upon the differential emphasis and stimulation the different cultural conditions provided.

The present results can be much more interpretable with reference to the previous observations of similar interest. The average levels in Gumpgookies obtained by Chinese and Puerto Rican students were relatively high and both comparable to the results of studies by Adkins and Ballif (1970). Although the Chinese children were slightly superior to the Puerto Ricans in Gumpgookies means, the ethnic effect on this variable was undiscernible. Of the three variables, the Chinese pupils scored significantly higher in IAR scale and considerably lower in test anxiety level than the Puerto Rican children. But, the most interesting result was that the mean levels in IAR and TASC attained by the Chinese group were remarkably similar to the earlier finding based on white samples (Crandall, 1965; Saranoff, et al. 1958), whereas the Puerto Rican children had test anxiety level similar to the findings on Negro group as described by Katz (1967) and Feld and Lewis (1969) and obtained exceptionally lower mean score, relative to other ethnic samples, on the internal control level as determined by IAR scale.

The mediating effects of the cultural variables upon motive acquisition was strongly suggestive from the present data. Though resembled in many aspects regarding demographic and linguistic background, the sociocultural environments and the socialization patterns adapted by the Chinese group appeared to enhance children's belief in internal control and mitigate their anxiety level while the Puerto Rican children were socialized to be more responsive to the failure- threatened situations and less confident of their own competence as sources of their accomplishment. In the literature of motivational research, the search for the mediating factors to link cultural influences and motivatio motivational expressions was not uncommon. The research s studies by Crandall (1963,1965), Rotter (1963,1966), Hill (1967) and Katz (1967,1969) gave empirical implications concerning the functional relation of test anxiety and I-E control to parent attitude, academic expectancy, reward

system, social reinforcement, value internalization, self-evaluation mechanism, and success-failure experience. All this evidence, of course, supported the crucial role of socialization practice in molding motivational pattern in each culture. The difference in mean level on IAR and TASC measures exicting between Chinese and Puerto Rican samples also occurred with the cultural-mediating position, but ran counter to the concept of cultural deprivation or cultural conflict as explanation of motivational deficit in certain culture. Though both belonging to thesame minority status, confronting the same situational contraints and adjustment problems, experiencing the same language difficulty unfavorable competition, the Chinese and Puerto Rican students still differed in expression of their test anxiety and internal control belief. Thus, the differential acquirement of achievement motives is not simply a function of the opportunity environment and reinforcement system provided in a culture as conceptualized by Clark (1965) or Gurin (1968), but a function of how one percieves, evaluates and reacts to the opportunity and reinforcement structure on the basis of the internalized standard as elaborated in Katz's theory (1967).

Group influence on motivational patterns based on five factors in Gumpgookies. Figure 2 and Tables 6 to 9 contain the results obtained from the testing of the hypothesis which assumed no cultural difference in the patterns of scores from the five factors in Gumpgookies. In these tables, the means, standard deviations, and the analysis results were given.

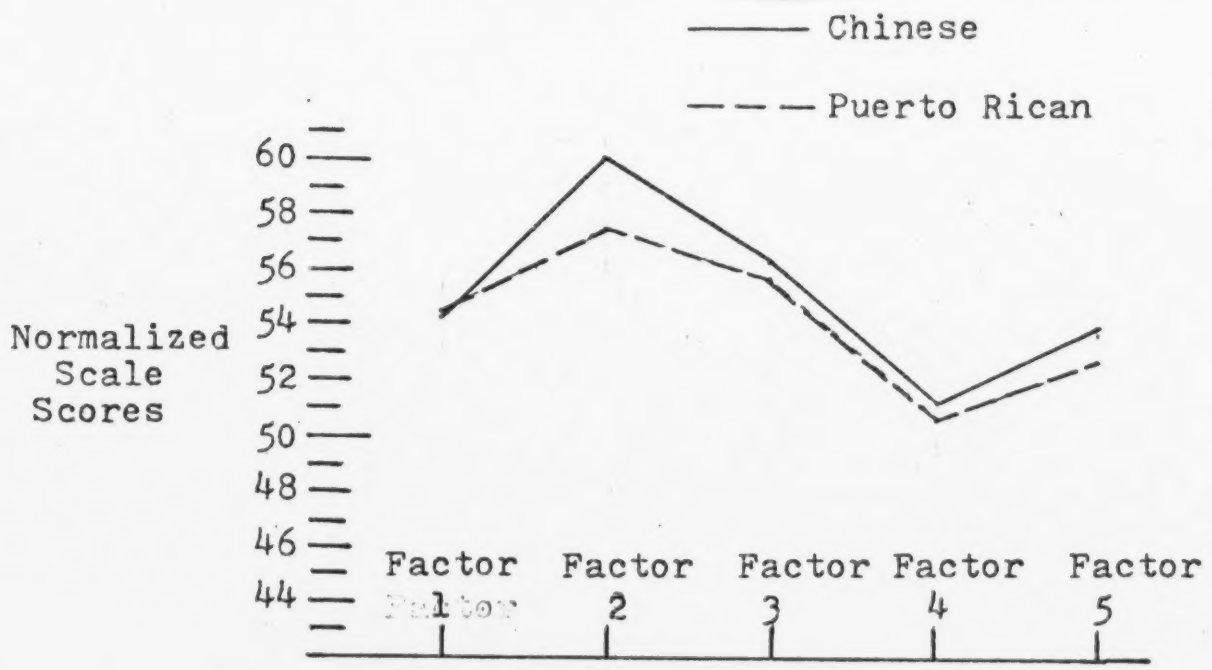

Figure 2-Pattern of motivational factor scores for each cultural group.

TABLE 6

Means, Standard Deviations and Ns for the Five Factors in Gumpgookies on Chinese and Puerto Rican Samples

Factor	Chinese			Puerto Rican		
	N	Mean	SD	N	Mean	SD
Factor 1	99	54.20	6.72	99	54.36	5.86
Factor 2	99	60.07	6.61	99	57.77	8.04
Factor 3	99	56.37	6.61	99	55.80	6.17
Factor 4	99	51.86	8.16	99	51.01	8.66
Factor 5	99	54.01	6.74	99	52.92	8.32

TABLE 7

Test of Group Effect upon Pattern Parallelism based on Five Factors for Chinese & Puerto Rican Samples

Source of Variation	d.f.	T^2	F	P
Parallelism	4/193	4.39	1.05	NS

TABLE 8

Test of Group Effect upon Pattern Levels based on Five Factors for Chinese and Puerto Rican Samples

Source of Variation	d.f.	t	P
Level	196	2.05	.05

TABLE 9

Test of Difference in Measure Means among the Five Factors for both Chinese and Puerto Rican Groups

Source of Variation	d.f.	T^2	F	P
Measure Effect	4/193	168.32	41.42	.01

Contrasts	Confidence Interval	Contrasts	Confidence Interval
1 v.s. 2	-5.04 -- -4.24*	2 v.s. 4	7.10 - 7.88*
1 v.s. 3	-2.19 - -1.43*	2 v.s. 5	4.76 - 6.16*
1 v.s. 4	2.30 - 3.40*	3 v.s. 4	3.96 - 5.16*
1 v.s. 5	0.28 - 1.36*	3 v.s. 5	2.11 - 2.95*
2 v.s. 3	2.43 - 3.23*	4 v.s. 5	-2.78 - -1.28*

The analysis of the pattern parallelism did not yield a significant T-square value. The cultural difference did not seem to show differential influences to affect the five constituents in Gumpgookies distributed in different pattern. Both the Chinese and the Puerto Rican students obtained the highest or the lowest mean on the same factor as reflected in the score patterns.

The statistical procedure used to test the difference in pattern level produced a t value, significant at .05 level which tended to reject the hypothesis of equal level between patterns. Though the factor means appeared to be distributed in the same shape in the two subsamples, the levels of the five factors taken together were significantly higher in Chinese sample than in Puerto Rican group. Thus, the cultural affiliation of the Chinese and Puerto Rican children did alter the strength structure in the score pattern, though not in the organization of the five different factors in Gumpgookies.

The T--square value on measure effect far exceeded the .01 level of significance and the hypothesis of mean difference among measures had to be rejected. The post hoc contrasts revealed that the mean score of each factor based on bothe cultural groups was significantly different from any of the other factors. To follow the factor interpretations reported in the factor-analysis studies by Adkins and Ballif (1970), the results of the present finding indicated that both the Chinese and the Puerto Rican students scored highest at the factor of school-work enjoyment and lowest at self-confidence factor with the instrumental activity, self-evaluation, and purposive factors scattered in between.

Considering the derivation procedure of the Gumpgookies factors and the common characteristics existing in the two cultural subsamples, the failure of the cultural effects to differentiate the patterns of the five motivational factors became less surprising. The common variance that formulated the five factors was based on individuals from ten ethnic-cultural groups including Chinese and Puerto Rican descents. There is a very high possibility that the items identified for these factors would receive the same response patterns and bear the same factor loadings from the Chinese and Puerto Rican students in the present study. Therefore, the differential effects existing in these two cultures might be overshadowed by the cultural-generality aspect of the instrument. The setting of a high educational goal for their children as a compensation function of the hard-struggling immegrant parents in both cultural groups, and the ease and democratic atmosphere in American school in contrast to the rather rigid and authoritarian control in the Chinese and Puerto Rican home life might possibly supply some causal connection with the high average in school-work enjoyment factor. The comparatively low mean in self-confidence factor obtained by students of these two

cultural groups reflected the insecure feeling and shy or withdrawn attitude usually found as concomitants of minority children. In addition, the competitions in physical situations permeating in the item content of self-confidence factor were less stressed in these two cultures than competitions in academic areas. The difference in pattern levels based on the five factors might probably be associated with the different amount of effort and concern the Chinese and the Puerto Rican parents exerted to reinforce the supportive role of socializing agents in order to actualize the common goal they set for their child-rearing practice.

Sex influence on motivational patterns based on three variables within each group. The second null-hypothesis was concerned with the sex effect upon the motivational pattern of three variables. However, the results on the measure effect of the pattern analysis are not reported here, as they were found duplicating exactly the results from the analysis of the group influence given in the earlier section. The downward extension of the results from the comparison of the measure means between groups to the comparison of the measure means between sexes is therefore considered real.

For the analysis of the pattern parallelism and level between boys and girls, the results regarding the two subsamples were summarized in Figures 3 and 4 Tables 10 to 15.

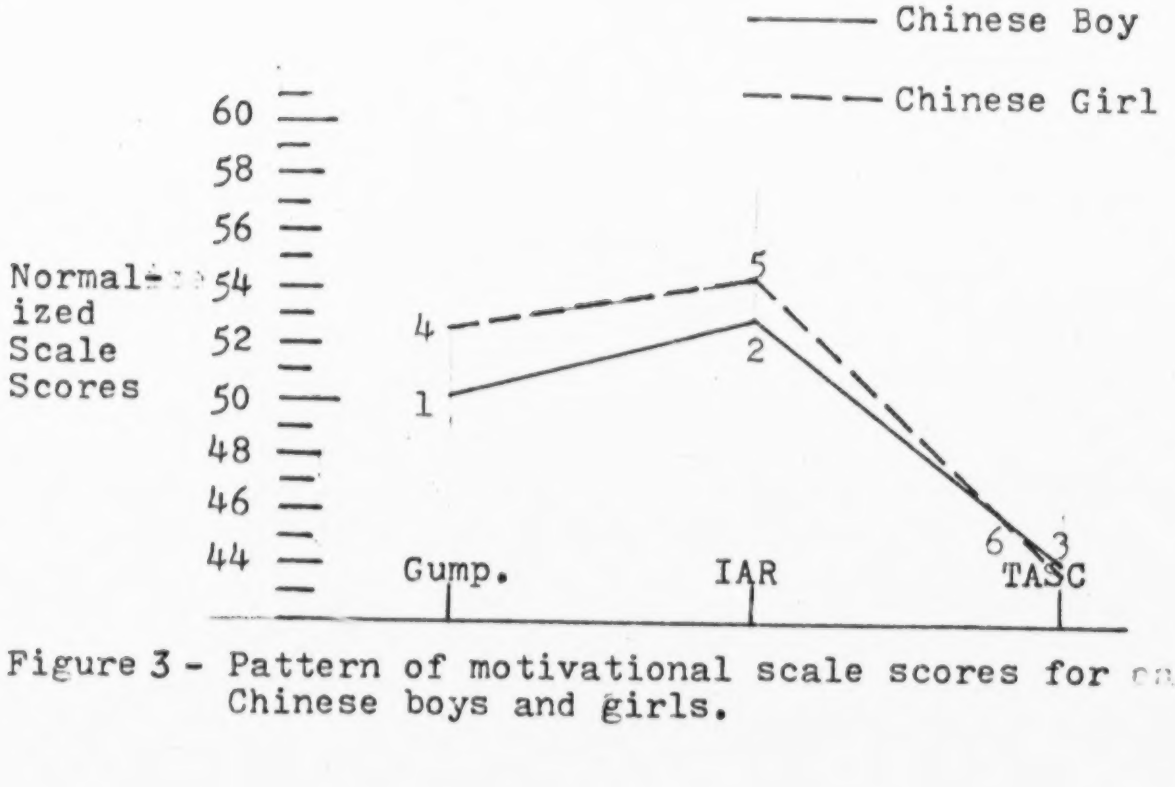

Figure 3 - Pattern of motivational scale scores for each Chinese boys and girls.

TABLE 10

Means, Standard Deviations and Ns for Gumpgookies IAR and TASC Scales on Chinese Boys and Girls

Scale	Chinese Boy			Chinese Girl		
	N	Mean	SD	N	Mean	SD
Gump.	50	50.33	12.50	49	52.58	7.62
IAR	50	52.65	10.45	49	54.19	9.48
TASC	50	44.44	7.92	49	44.12	6.87

TABLE 11

Test of Sex Effect upon Pattern Parallelism based on Gump., IAR and TASC Scales for Chinese Boys and Girls

Source of Variation	d.f.	T^2	F	P
Parallelism	2/96	1.11	0.55	NS

TABLE 12

Test of Sex Effect upon Pattern Levels based on Gump., IAR and TASC Scales for Chinese Boys & Girls

Cource of Variation	d.f.	t	P
Level	97	1.13	NS

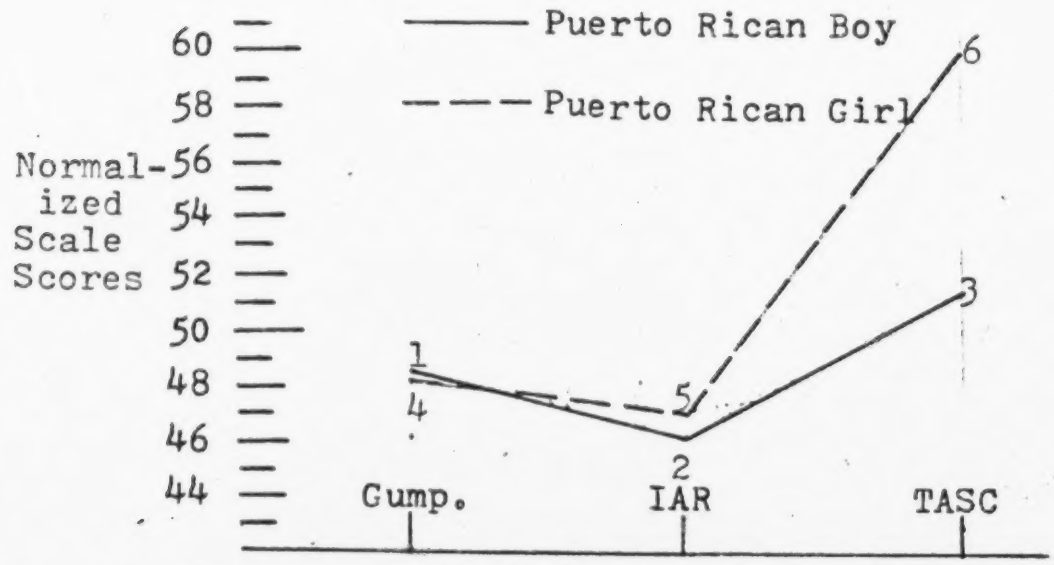

Figure 4 - Pattern of motivational scale scores for Puerto Rican boys and girls.

TABLE 13

Means, Standard Deviations and Ns for Gumpgookies, IAR and TASC Scales on Puerto Rican Boys and Girls

Scale	Puerto Rican Boy			Puerto Rican Girl		
	N	Mean	SD	N	Mean	SD
Gump.	50	48.72	9.16	49	48.36	9.44
IAR	50	46.18	7.87	49	46.98	9.15
TASC	50	51.60	7.55	49	59.91	8.22

TABLE 14

Test of Sex Effect upon Pattern Parallelism based on Gump., IAR and TASC Scales for Puerto Rican Boys & Girls

Source of Variation	d.f.	T^2	F	P
Parallelism	2/96	15.90	7.86	.01
Post hoc Contrasts		Confidence Intervals		
1 - 2 v.s. 4 - 5		-10.92	-	8.60
2 - 3 v.s. 5 - 6		-16.06	-	-0.05*

TABLE 15

Test on Sex Effect upon Pattern Levels based on Gump. IAR and TASC Scales for Puerto Rican Boys & Girls

Source of Variation	d.f.	T^2	F	P
Level	3/95	26.94	8.78	.01
Post hoc Contrasts		Confidence Intervals		
1 v.s. 4		-7.62	-	6.90
2 v.s. 5		-7.60	-	6.00
3 v.s. 6		-14.46	-	-2.16*

* indicates significant from zero differnce at .01 level.

Based on the T-square values on parallelism given in Tables 10 and 13, interaction between male and female patterns was found significant in Puerto Rican sample but not in Chinese sample. The rejection of the parallelism hypothesis in the Puerto Rican group indicated that the organization of the three variables into pattern differed depending on the male and the female characteristics of the Puerto Rican children. The post hoc procedure identified

that the IAR and TASC scales interacted across the two sub-groups.

For the Puerto Rican sample, the mean levels of the three variables for boys and for girls were compared via T-square statistics and the observed value thus yielded was significant at .01 level. The post hoc constrasts showed that the Puerto Rican girls definitely exceeded the Puerto Rican boys on the test anxiety level. In the Chinese group, however, the pattern level, as indicated by the t value in Table 11, was not significant. The motivational expressions of the Chinese children, as revealed by the Gumpgookies, IAR and TASC scales, did not discriminate between boys and girls in terms of the score pattern as well as pattern levels.

Previous studies based on white samples did not observe sex difference in Gumpgookies and IAR total scores. The investigations of sex effect upon test anxiety, however, consistently showed significant differences, with higher mean score falling on the female children. This pattern of findings on sex differences based on the three scales had strong resemblance of the analysis results found in Puerto Rican group, though not in Chinese sample. The crux of the matter concerning the sex differences between the two cultures lay on the variable of test anxiety. The anticipated difference in test anxiety level between boys and girls was not obtained in Chinese children. As interpreted by Sarason group (1960), the higher test anxiety level usually manifested by girls than boys was due to the differential roles the American culture imposed upon the two sexes which had definite effect on their attitude toward expression and admission of anxiety. The masculine armor accumulated in the American males, for instance, would formulate a build-up in defensiveness against admitting an anxiety. The failure to find sex difference in test anxiety in Chinese group did not mean that the Chinese cult culture placed no valiant role on the masculine sex but was rather a reflection of the self-restrain and the reserved character fostered in the Chinese children of both sexes which could undoubtedly bring a decreament of their test anxiety levels. It must also be noted whether the interpretation of the defensive mechanism of the masculine sex as " normal " attitude toward anxiety by Sarason with his white population could be generalized to the two cultural groups in the present study still remained to be a research question. Nevertheless, considering the varying results obtained among cultures on the problem of sex difference, the sex role in responding to TASC questions tended to be more susceptible to cultural influences than to constitutional variations between the two sexes.

Sex influence on motivational patterns based on five factors in Gumpgookies. The second part of the second null-hypothesis deals also with pattern differences between male and female students based on five subscale factors in Gumpgookies. The analysis results were summarized in Figures 5 and 6 Table 16 to 21.

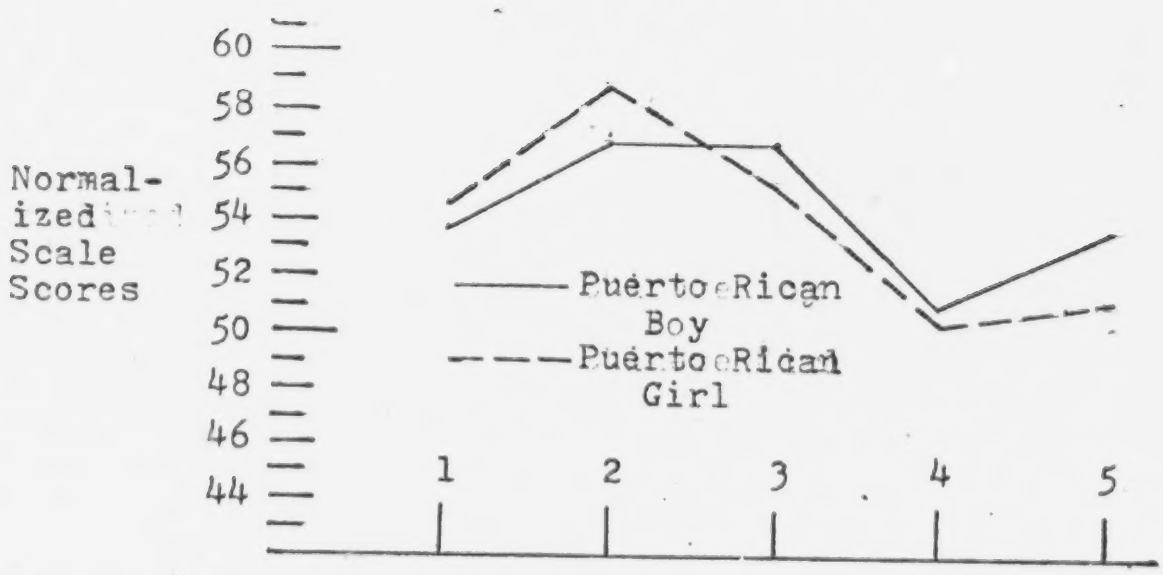

Figure 5-Pattern of motivational factor scores for Puerto Rican boys and girls.

TABLE 16

Means, Standard Deviations and Ns for Five Factors in Gumpgookies on Puerto Rican Boys and Girls

Factor	Puerto Rican Boy			Puerto Rican Girl		
	N	Mean	SD	N	Mean	SD
1. Instrumental	50	53.88	5.47	49	54.85	6.19
2. Work-enjoyment	50	56.64	9.05	49	58.92	6.64
3. Evaluative	50	56.46	6.13	49	55.13	6.13
4. Self-confident	50	51.17	8.53	49	50.84	8.68
5. Purposive	50	54.42	6.94	49	51.38	9.29

TABLE 17

Test of Sex Effect upon Pattern Parallelism based on Five Factors in Gumpgookies for Puerto Rican Boys & Girls

Source of Variation	d.f.	T^2	F	P
Parallelism	4/95	8.27	2.00	NS

TABLE 18

Test of Sex Effect upon Pattern Levels based on Five Factors in Gumpgookies for Puerto Rican Boys and Girls

Source of Variation	d.f.	t	P
Level	97	0.44	NS

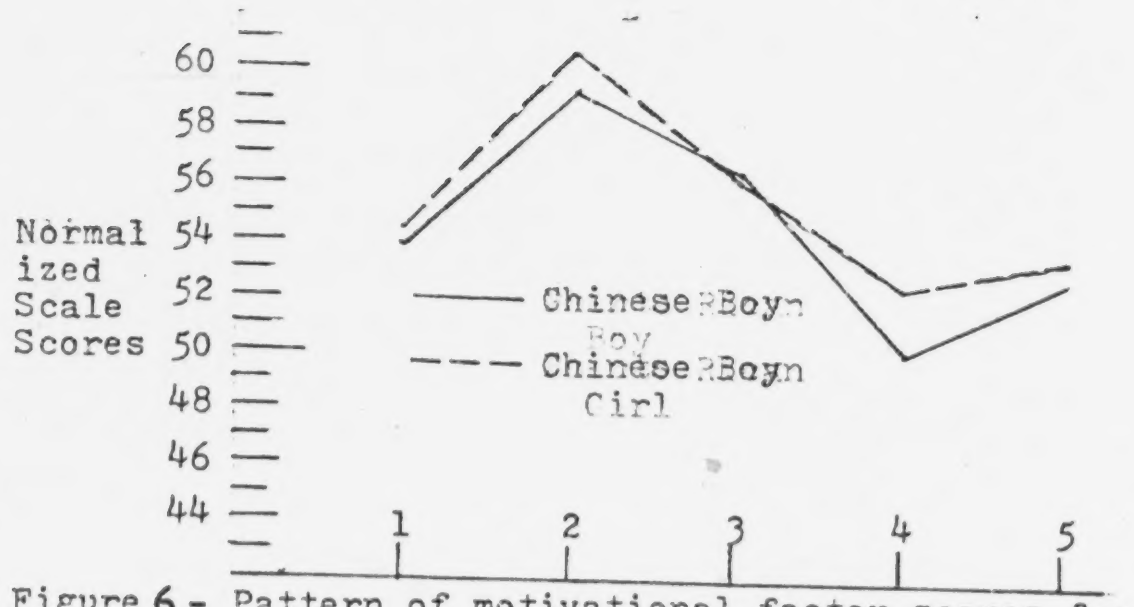

Figure 6 - Pattern of motivational factor scores for Chinese boys and girls.

TABLE 19

Means, Standard Deviations and Ns for Five Factors in Gumpgookies on Chinese Boys and Girls

Factor	Chinese Boy N	Mean	SD	Chinese Girl N	Mean	SD
1. Instrumental	50	53.99	6.59	49	54.42	6.84
2. Work-enjoyment	50	59.30	6.01	49	60.87	7.07
3. Evaluative	50	56.54	7.79	49	56.22	5.11
4. Self-confident	50	50.88	9.66	49	52.85	6.10
5. Purposive	50	53.70	6.62	49	54.33	6.85

TABLE 20

Test of Sex Effect upon Pattern Parallelism based on Five Factors in Gumpgookies for Chinese Boys and Girls

Source of Variation	d.f.	T^2	F	P
Parallelism	4/95	1.47	0.35	NS

TABLE 21

Test of Sex Effect upon Pattern Levels based on Five Factors in Gumpgookies for Chinese Boys and Girls

Source of Variation	d.f.	t	P
Level	97	1.19	NS

The T-square value determining the pattern parallelism between male and female groups was sonsidered non-significant in either Chinese sample or Puerto Rican sample. Thus, within each of the two cultural groups, the score pattern of the five factor means for boys was found parallel with that for girls.

The difference in pattern level between boys and girls was tested via student t statistics and found non-significant either in both cultural groups. The classification of the group members into boys and girls in each subsample did not show differential effect upon their responses to the five subscales in Gumpgookies in terms of score pattern and pattern levels. For boys and for girls, the mean of school-work enjoyment factor was the highest and the lowest mean fell on the self-confidence factor.

The present data supported the previous studies of Gumpgookies in that the sex differences are negligible not only in total score but also in the five subscale means. There, too, provieded some bases to believe that the item composition in each factor in Gumpgookies was not geared to discriminate the responses between boys and girls in the populations so far observed.

Multiple regression analysis

In the analysis of motivation-achievement relationship, the three motivational variables served as predictors in one set of observations and the scores of the five factors in Gumpgookies, in another. The dependent variables were two achievement areas, Reading and Arithmetics, each correlating individually with a set of independent variables. These two academic areas, typically representing the achievement performance of the elementary school children, were evaluated by the subtests in MAT. The separation of the analyses by subject area was based on the bilingual feature and the differential achievement attitude and competence observed in two subsamples which would possibly produce differential effect upon the relation patterns between the motivational and achievement variables.

Relation between the three motivational variables and reading performance of students within each cultural group. The hypothesis of relationship between the three motivational variables and reading achievement was examined by means of zero-order correlation and multiple regression analysis. Table 22 and 23 show, for each cultural sample separately, the multiple regression coefficients and the corresponding F values for the independent variables by order of stepping in the equation together with the zero-order correlation coefficients in the intercorrelation matrix.

TABLE 22

Zero-order Intercorrelations, Multiple Correlations and F values for Chinese Reading Scores and Three Independent Variables in Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation			
			Gump.	TASC	IAR	Reading
Gump.	.250	6.46*	1.00	0.02	0.21*	0.24*
TASC	.300	4.75*		1.00	0.04	-.16
IAR	.300	3.13*			1.00	0.03

TABLE 23

Zero-order Intercorrelations, Multiple Correlations and F Values for Puerto Rican Reading Scores and Three Independent Variables in Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation			
			IAR	Gump.	TASC	Reading
IAR	.436	22.80**	1.00	0.02	0.13	0.43**
Gump.	.482	14.58**		1.00	-.06	0.21*
TASC	.483	9.66**			1.00	0.01

* Significant at the .05 level.
** Significant at the .01 level.

For Chinese children, the multiple correlation of .30 between the three motivational scales and reading scores was found significant at .05 level. Inspection of Table 22, however, revealed that the IAR scale contributed virtually no predictive validity for reading level. As demonstrated in the correlation of .21 between IAR and Gumpgookies scales, the tendency that the belief in self-responsibility of IAR test overlapped considerably the concepts of self-evaluative, self-initiated purpose and self-awareness of competence responses in Gumpgookies was absolute. This tendency, of course, caused redundancy of the IAR score to account for the predicted variance in the criterion variable. What was left as unique variance in IAR scale was the identification of the responsible source for the academic outcomes which appeared obviously not so an important motive as others in accounting for Chinese reading performance. The correlational data presented here implied that the motivation to achieve as assessed by Gumpgookies and the test anxiety obtained from TASC were more responsible for the reading growth in Chinese children. Of the three predictors, Gumpgookies correlated the highest ($r = .24$, $P < .05$) with Chinese reading scores. Test anxiety introduced into the equation next increased the

magnitude of the multiple correlation from .25 to .30, though not accompanied by the significant regression effect added by this variable for the variance accounted for (F= 2.94, P = NS).

For Puerto Rican children, the multiple correlation of .48 of the three motivational variables to reading level was significant at .01 level. IAR scale strongly correlated with reading scores. The relationship between Gumpgookies and reading was also significant. Test anxiety, when entering in the equation, made no gain in the prediction of the criterion. The over-responsiveness to the failure-threatened conditions prevailing in the Puerto Rican group certainly reduced the predictive efficiency of the scale. The unrealistically admitting anxiety experience in the Puerto Rican female added contaminative effect to the predictive validity. Obviously, their better performance in reading was more often contingent on their feelings of self- or other-responsibility and their motivation to achieve than on their experience in test anxiety. The Gumpgookies scale, stepping in next, also contributed to improve the prediction by bringing in significant increament of variance accounted for (F= 5.35, P< .05) beyond that associated with IAR stepping in the equation first.

With fairly homogeneous groups and students' I. Q. level uncontrolled, the motivation-achievement correlation obtained for the two subsamples was acceptably high. In consistence with previous findings (Atkinson, 1960; Sarason, 1963; Smith, 1964), the relation between motivation to achieve and test anxiety was found close to zero in both cultural groups. The three predictor variables did not all significantly contribute to the prediction of the reading criterion. The IAR in Chinese group and TASC in Puerto Rican sample were either thought of redundant or spurious in relation to reading competence. That the highly responsible subjects act as highly success-motivated individuals as described by Meyer (1968) and Weiner (1970) received support from the correlational data for the Chinese sample. In view of the overall correlation coefficients, the three independent variables showed comparatively higher predictive efficiency and accuracy for the Puerto Rican sample than Chinese group. For Chinese, children with higher motivation to achieve and lower test anxiety were more competent in English reading than those with lower motivation to achieve and higher test anxiety level. This appeared very close to the statement already made by Atkinson (1960) for his hypothetical model of achievement motivation. For Puerto Rican, students' reading accomplishment was more a function of their belief in self-responsibility and motivation to achieve than their stated anxiety. This justified also to a great extent the research findings by Crandall (1962) and Coleman (1966).

Relation between the three motivational variables and

arithmetic of students within each cultural group. The hypothesis and statistical analysis for the relation with arithmetic remained the same as that with reading. The results of the correlational analyses were summarized in Tables 24 and 25, separately for different culture.

TABLE 24

Zero-order Intercorrelations, Multiple Correlations and F values for Chinese Arithmetic and Three Independent Variables in Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation			
			IAR	TASC	Gump.	Arith.
IAR	.180	3.27	1.00	0.04	0.21*	o.18
TASC	.258	3.42*		1.00	0.02	-.17
Gump.	.278	2.70*			1.00	0.13

TABLE 25

Zero-order Intercorrelations, Multiple Correlations and F Values for Puerto Rican Arithmetic and Three Independent Variables in Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation			
			Gump.	IAR	TASC	Arith.
Gump.	.298	9.46**	1.0C	0.02	-.06	0.29**
IAR	.361	7.21**		1.00	0.13	0.21*
TASC	.365	4.88**			1.00	-.04

* Significant at the .05 level.
** Significant at the .01 level.

For Chinese children, the multiple correlation of .27, as related to arithmetic, just reached statistical significance at .05 level. The three motivational variables combined together did correlated significantly with levels in arithmetic. In contrast to what have been found with reading performance, the first variable stepped in equation was IAR scale. Unlike reading achievement, arithmetic creates fewer language obstacles. Students whose belief in own efforts were instrumental in the reinforcements would be presumably to better master arithmetic than reading achievement.which the bilingual subject though with internal control would not necessarily perform well because of his language deficiency. Therefore, with different areas of competition, different predictive efficiency is expected from different predictors. In general, IAR, selected first in the equation, related slightly with arithmetic. The joint of TASC with IAR in the regression magnified the

multiple correlation coefficient and made the F significant at .05 level. However, the increament of variance accounted for with the additional variable of TASC was not significant (F= 3.49, P = NS). The contribution of Gumpgookies when added to the regression was also minimal.

For Puerto Ricans, the multiple correlation was highly significant. As shown in the bivariate analyses, both Gumpgookies and IAR correlated significantly with arithmetic scores. Gumpgookies seemed to be more strongly related to the criterion than IAR scale. For the same reason as given previously, the test anxiety level was the least efficient predictor of arithmetic performance. The inclusion of IAR variable in the equation with Gumpgookies brought significant increase in the regression effect (F= 4.61, P<.05) over that associated with Gumpgookies. The perception of self- or other-responsibility of academic outcomes did add something to the qualities of motivation to achieve as revealed by Gumpgookies in predicting arithmetic competence in Puerto Rican students.

In general, the motivational variables correlated stronger with reading than arithmetic performance in both cultural groups. This finding confirmed the research [illegible] results described by Crandall (1962) and Battle (1966) in which reading and arithmetic scores were separate criteria on students in elementary or junior high school level. The verbal aspect of the motivational measures, apparently requiring reading competence rather than numerical ability for perfect responses, suggested a logical explanation of the stronger association of the independent variables to the former than the latter. In Chinese group, the conjoint effect of the conceived internality or externality and the expressed test anxiety held a slight though significant relationship with their arithmetic proficiency while the motivational constituents of Gumpgookies adjoined the inter internal-external control feeling to predict quite efficiently the Puerto Rican arithmetic performance. The test anxiety expression was surely not a meaningful conceptualization with which to account for the achievement levels in Puerto Rican children. Thus, the different cultural emphases, the group difference in motivational disposition mixed with different attitude and compentence toward subject area and the individual language background were reflected from the differential relation patterns between the independent and criterion variables in the present study.

Relation between the five factors in Gumpgookies and reading score within each cultural group. The second part of the third null-hypothesis concerns the relationship between academic achievement and the five subscale factors in Gumpgookies. Same statistical analyses were employed to examine the hypothesis. The results with reading score were presented in Tables 26 and 27 for the two subsamples separately.

TABLE 26

Zero-order Intercorrelations, Multiple Correlations and F Values for Chinese Reading Score and Five Factors in Gumpgookies by Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation 2	5	1	4	Reading
3. Evaluative	.171	2.94	-.13	.14	.10	.04	.17
2.Work-enjoyment	.217	2.38		-.36**	.51**	.51**	.10
5. Purposive	.282	2.74*			-.28*	-.10	.14
1. Instrumental	.290	2.16				.19	.12
4.Self-confident	.293	1.76					.12

TABLE 27

Zero-order Intercorrelations, Multiple Correlations and F Values for Puerto Rican Reading Score and Five Factors in Gumpgookies by Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation 3	4	1	5	Reading
2.Work-enjoyment	.318	10.94**	.09	.29**	-.18	-.14	.31**
3. Evaluative	.332	5.95**		-.14	.03	.15	.12
4.Self-confident	.345	4.28**			-.17	-.17	.16
1. Instrumental	.350	3.28*				.07	.12
5. Purposive	.350	2.61*					-.05

The inclusion of all predictor variables in the multiple prediction of reading score yielded a significant multiple correlation ($R = .35$, $P < .01$) for the Puerto Rican sample and a non-significant correlation coefficient ($R = .29$) for the Chinese group. Except the work-enjoyment factor in intercorrelation matrices of the two subsamples, none of the factors correlated significantly with the reading criterion in the two subsamples. For Chinese children, those who expressed satisfaction on school-related activities were found also possessing good knowledge of how to perform school tasks and also feeling confidence in competition but meanwhile showing low perception of future goals. This tendency of high intercorrelation among independent variables augmented the regression weight for the work-enjoyment factor and caused redundency of the instrumental and self-confidence factors in the multivariate analysis for the Chinese group. For Puerto Ricans, the intercorrelations among the five predictors were satisfactorily low except one significant r between work-enjoyment and self-confidence

factors. This implied that Puerto Rican children who preferred school work as opposed to other tasks tended to feel confident in the competition in certain physical activities. A careful comparison of the size and the sign of the coefficients in the intercorrelation matrices clearly indicated that the different cultural influences may well affect the students to produce different response patterns and probably different factor composition for the five subscales when responding to the items in Gumpgookies. So, it is still a speculation that for the two subsamples the factor construct of the five factors in Gumpgookies remained the same as were defined in the validation studies by Adkins and Ballif (1970).

Very little have been divulged regarding the relative predictive efficiency among the five factors in Gumpgookies. The breakdown of a measurement in a number of subscales theoretically reduced the reliability and hence the predictive validity of the instrument. But, this weakness was removed by assigning regression weights to the subscales when the factor scores in Gumpgookies were computed. Thus, some scales such as evaluative scale in Chinese group and work-enjoyment factor in Puerto Rican group produced even higher predictive weights than the total scale of Gumpgookies. The five factor scores differed in their predictive efficiency but not much in their order stepping in the regression generated for separate cultural groups. The evaluative and work-enjoyment factors dominated the predictive function in the estimation of reading ability in the two subsamples. Although optimum or significant relationship with reading scores might arrive at certain stage of the step-wise multiple regression analysis, none of the factors added to the equation brought significantly additional regression effect to account for the residual criterion variance over the preceding term, and the last two terms entering into the regression for both cultural groups contributed little or no predictive effects.

Relation between the five factors in Gumpgookies and arithmetic score within cultural group. On the relationship with arithmetic performance, Tables 28 and 29 summarized the results of both bivariate and multivariate analyses.

TABLE 28

Zero-order Intercorrelations, Multiple Correlations and F Values for Chinese Arithmetic and Five Factors in Gumpgookies by Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation 2	3	1	4	Arith.
5. Purposive	.171	2.92	-.36**	.14	-.28**	-.10	.17
2. Work-enjoyment	.237	2.87		-.13	.51**	.51**	.09
3. Evaluative	.260	2.29			.10	.04	.11
1. Instrumental	.268	1.82				.19	-.01
4. Self-confident	.276	1.54					.02

TABLE 29

Zero-order Intercorrelations, Multiple Correlations and F Values for Puerto Rican Arithmetic and Five Factors in Gumpgookies by Order of Entry into Equation

Entering Variable	Multiple R	F	Intercorrelation 3	5	4	1	Arith.
2.Work-enjoyment	.239	5.87*	.09	-.14	.29**	-.18	.23*
3. Evaluative	.274	3.91*		.15	-.14	.03	.15
5. Purposive	.279	2.69			-.17	.07	.04
4.Self-confident	.281	2.02				-.17	.06
1. Instrumental	.281	1.60					-.02

On arithmetic achievement, the five factors correlated .27 for the Chinese group and .28 for the Puerto Rican sample, both considered statistically non-significant. Based on the bivariate analyses, the single significant coefficient ($r = .23$, $P < .05$) was found on the work-enjoyment factor in Puerto Rican sample. The lack of significant relationship between the five motivational factors and the arithmetic criterion was attributable to several conditions. As mentioned previously, the high intercorrelations among predictors produced redundant common variance with the criterion variable and therefore minimized the regression effect for some independent variables. Second, some items in the problem solution section of the arithmetic test were found somewhat beyond the understanding level of the bilingual students in the present study. Consequently, these items did not exhibit any discrimination power but loaded with guessing factor which probably brought a decrease in the true score variance obtained from the criterion measure. Third, it was revealed by some investigators (Crandall, 1965) that older children may have developed increased sense of social desirability in responding to motivational scales. Certain extent of social desirability factor might be reasonably estimated to be incoporated in the responses to the gumpgookies items from the second and third graders in the two subsamples and this certainly contaminated the relationship between the arithmetic and the five factor scores. These results implied the more elaboration and research effort needed to be given to the measuring instruments used with the Chinese and Puerto Rican samples in order to eliminate the error variance and improve the predictive validity in further correlational studies.

In general, the work-enjoyment, evaluative, and purposive factors in Gumpgookies played a dominant role in the estimation of the arithmetic performance for both cultural groups. The joint effect of work-enjoyment and

evaluative factors achieved almost the optimun relationship (R = .27, F = 3.91, P< .05) with arithmetic in Puerto Rican sample. None of the independent variables entering into the equation significantly reduced the residual variance of the criterion scores that had not been accounted for by the preceding terms. The language influence in Gumpgookies has been well demonstrated by the significant relation with ITPA (Adkins and Ballif, 1970) and this relationship was indirectly reflected by the higher correlation of the five factor scores to reading ability than arithmetic aptitude.

Estimation of beta weights for the three motivational variables with reading and arithmetic performance. The contribution of each independent variable in predicting the criterion was determined by the size of the beta weight as it stepped in the regression equation. The hypothesis of difference of each beta weight from zero slope was tested by t statistics. Furthermore, the order the independent variable stepped in the regression might serve as index of importance in terms of its relation with the criterion test. Tables 30 and 31 show the beta weights, the t values, and the stepping-in order of the three independent variables, by cultural group, for reading and arithmetic performance separately.

TABLE 30

Beta Weights, t Values, and Stepping-in Order of The Three Independent Variables with Reading in Chinese and Puerto Rican Samples

Variable	Chinese			Puerto Rican		
	Step	Beta	t	Step	Beta	t
Gump.	1	.463	2.55*	2	.466	2.27*
TASC	2	-.471	-1.69	3	-.074	-0.31
IAR	3	-.027	-0.07	1	2.074	4.08**

TABLE 31

Beta Weights, t Values, and Steppimg-in Order of The Three Independent Variables with Arithmetic in Chinese and Puerto Rican Samples

Variable	Chinese			Puerto Rican		
	Step	Beta	t	Step	Beta	t
Gump.	3	.207	1.06	1	.700	3.02**
TASC	2	-.568	-1.88	3	-.156	-0.58
IAR	1	.669	1.66	2	1.072	2.20*

* Significant at the .05 level.
** Significant at the .01 level.

The relative importance of each independent variable in the regression analysis is evaluated by its beta weight and the order it enters into equation. The significant beta weight signifies the real relation with the criterion, independent of the influences of other predictor variables. And the sooner the predictor steps into the regression, the larger the proportion of variation in the criterion variable is accounted for. For Chinese children, the only significant beta weight ($P < .05$) fell on Gumpgookies in predicting the reading criterion. The beta weights for TASC and IAR scales did not exhibit significant predictive power of their own. For Puerto Rican group, IAR carried a highly significant beta weight as related to reading scores. Gumpgookies also achieved a significant gain of regression effect as signified by the significant regression weight (P .05) by holding constant the influence of IAR score upon reading. In general, Chinese reading performance was best predicted by the level of motivation to achieve as determined by Gumpgookies, modestly by test anxiety and minimally by beliefs in self-responsibility assessed by IAR, whereas in Puerto Ricans the IAR scale was the best predictor, the Gumpgookies a good supporter, and TASC a very weak estimator of their reading ability.

In predicting Chinese arithmetic scores, the IAR scale came in the regression first, Gumpgookies next, and then the TASC questionnaire, but none of them produced significant beta weights to account for the criterion even though the conjoint effect of the three predictors yielded a significant multiple correlation. For the Puerto Rican children, the two predictors, Gumpgookies and IAR scales, each contributed significantly to the prediction of scores of arithmetic even with the remaining independent variables partialing out. The variable entered in the equation last was test anxiety which was considered rather unimportant in terms of its relation to the criterion.

The relative importance of contributions of the independent variables was clearly indicated from the present data. The obvious cultural differences in predictive efficiency between the three motivational variables and academic achievement justified the interpretation that differential relation patterns existed among cultures. The regression weight of an independent variable which is best for one culture need not, and generally is not, best for another culture.

Estimation of beta weights for the five factors in Gumpgookies with reading and arithmetic performance. The next hypothesis dealing with the contribution of beta weight based on the five factors in Gumpgookies was tested by the same statistical procedures. The analysis results were presented in Tables 32 and 33 for reading and arithmetic criterion respectively, by race.

TABLE 32

Beta Weights, t Values, and Stepping-in Order of the Five independent Variables with reading in Chinese and Puerto Rican Samples

Five Factors	Chinese Step	Chinese Beta	Chinese t	Puerto Rican Step	Puerto Rican Beta	Puerto Rican t
Instrumental	4	.200	.73	4	-.172	-.59
Work-enjoyment	2	.298	.90	1	.570	2.57*
Evaluative	1	.343	1.42	2	.324	1.17
Self-confident	5	.102	.46	3	.179	.87
Purposive	3	.456	1.86	5	-.038	-.18

TABLE 33

Beta Weights, t Values, and Stepping-in Order of the Five independent Variables with Arithmetic in Chinese and Puerto Rican Samples

Five Factors	Chinese Step	Chinese Beta	Chinese t	Puerto Rican Step	Puerto Rican Beta	Puerto Rican t
Instrumental	4	-.217	-.73	5	.048	0.15
Work-enjoyment	2	..689	1.93	1	.514	2.13*
Evaluative	3	.331	1.27	2	.384	1.27
Self-confident	5	-.164	-.69	4	.073	.33
Purposive	1	.533	2.01*	3	.127	.57

* Significant at the .05 level.
** Significant at the .01 level.

Inspection of the two tables indicated that only the relation of the purposive factor with Chinese arithmetic score and the work-enjoyment factor with Puerto Rican reading and arithmetic scores yielded significant beta weights (P .05). Though the relative importance in predictive function among the independent varaibles was not clearly decided by the statistical values, certain predictors definitely contributed more to account for the criterion variance than others in the two subsamples. For instance, the purposive, evaluative and work-enjoyment factors appeared to be more influential than others in estimating both reading and arithmetic performance in Chinese group while the same criteria in the Puerto Rican sample was practically determined by work-enjoyment and evaluative factors. The data tended to show that the variation of

of predictive efficiency derived from the five factors was smaller comparing across criterion measures than across cultural groups.

In the prediction of the achievement performance, the first three factors stepped in the equation were purposive, evaluative, and work-enjoyment for the Chinese samples; and work-enjoyment, evaluative, and purposive factors for the Puerto Rican group. The lack predictive efficiency in instrumental and self-confident scales was partly due to the limited construct validity of the factors and partly to the different conception systems existing in students of these two cultures which would possibly led to different responding patterns from those by pupils in the original studies. It is believed that relatively higher regression effect would be derived from the five factors and the overall relationship with the criterion variable would be expected to be higher if the factor composition of the five factors attained higher level of purity and validity on the basis of the present samples.

Estimation of homogeneity of regression planes based on three motivational predictors. The statistical procedure employed here is to test the hypothesis of homogeneity of regression planes computed for the two cultural groups. Specifically, the difference between the two vectors of beta weights in the two regression equations was tested via the likelihood ratio. The analysis results were presented with F values in Tables 34 and 35 for reading and arithmetic criterion separately.

TABLE 34

Test of Homogeneity of Regression based on Three Predictor Variables with Reading for Chinese and Puerto Rican Groups

Source of Variation	d.f.	S.S.	M.S.	F	P
Due to homogeneity	3	21324.00	7108.00	10.39	.01
Due to error	190	129980.81	684.10		

TABLE 35

Test of Homogeneity of Regression based on Three Predictor Variables with Arithmetic for Chinese & Puerto Rican Groups

Source of Variation	d.f.	S.S.	M.S.	F	P
Due to homogeneity	3	14117.81	4705.93	5.62	.01
Due to error	190	159148.50	837.62		

The hypothesis of homogeneity of regression was rejected on the basis of the highly significant F values obtained on both reading and arithmetic criteria, indicating differential relation pattern existing between the two cultural groups when related to the two achievement areas. A comparison of the beta in Tables 30 and 31 revealed that the group variation in the regression weights of IAR and TASC scales was probably the major source of the overall significant F value in the homogeneity regression test on reading criterion. This hinted at the interpretation that the IAR and TASC scales contributed quite differently to associate with pupil reading for Chinese and Puerto Ricans. When the arithmetic ability was concerned, the beta weights of all the three motivaional measures contributed to the group variation in the homogeneity test of the two regression planes. The significant interaction of the two regression planes highlighted the differential regression effects in the two regression equations, with each predictor variable associating in different degree with the scholastic achievement within each culture.

Estimation of homogeneity of regression planes based on five factors in Gumpgookies. The test of homogemeity of regression basedon five factors in Gumpgookies formulated the second part of the null-hypothesis which was examined by the same statistical procedures. The results were summarized in Tables 36 and 37 for different subject areas.

TABLE 36

Test of Homogemeity of Regression based on Five Predictor Variables with Reading for Chinese and Puerto Rican Groups

Source of Variation	d.f.	S.S.	M.S.	F	P
Due to homogemeity	5	23367.13	4673.42	3.72	.01
Due to error	186	233155.37	1253.52		

TABLE 37

Test of Homogeneity of Regression based on Five Predictor Variables with Arithmetic for Chinese & Puerto Rican Groups

Source of Variation	d.f.	S.S.	M.S.	F	P
Due to homogemeity	5	19261.81	3852.36	2.61	.05
Due to error	186	274233.87	1474.37		

The F value obtained on reading criterion was significant at .01 level, and on arithmetic score, at .05 level.

This finding tended to show that the factors in Gumpgookies, also held differential regression effects within each culture in the estimation of achievement-related behavior. An examination of Tables 32 and 32 indicated that the most noticable variation in beta weights across cultures was found on work-enjoyment, purposive, and instrumental factors for both observations based on reading and arithmetic scores. Thus, the cultural impact upon the differntial striving efforts as determinants of achievement performance was well demonstrated by the significant results from the homogeneity test of the regression planes generated from the three motivational variables as well as the five factors in Gumpgookies.

CHAPTER IV

Conclusions and Recommendations

Conclusions

On the basis of the analysis results and in view of the limitations of the experimental methods, the following conclusions were drawn:

Group differences in motivational patterns. Based on Gumpgookies, IAR and TASC scales, the patterns of motivational scores for Chinese and Puerto Rican samples differed significantly in shape, level and measure means. Salient interaction in IAR and TASC mean scores across culture was subsequently identified. The Chinese received higher mean on internal control and Puerto Rican received higher mean on test anxiety. Within each culture, each scale mean score was found significantly different from another. The specific pattern disclosed in each sample fit quite well in the cultural interpretation for the differential development of the three achievement motives. The mean levels scored by Chinese and Puerto Rican children on the three scales were considered in consistence with the previous findings based on white and Negro population respectively.

In terms of the five factors in Gumpgookies, the pattern of scores for Chinese group was found parallel with that of Puerto Rican group but significantly different in level of the pattern, favoring the Chinese sample. Significant differences in scale means averaged from the total group were observed among the five factors. It must be noted, however, the parallel patterns observed between the two cultures may well be reflecting the cultural generality of the factor scroes rather than focusing on the distinctive features existing between the two subsamples. Nevertheless, the variation in pattern levels as well as scale means implicated the role of socialization practice characterizing the ethnicity of the two sub-groups.

Sex differences in motivational patterns. The motivational expression determined by Gumpgookies, IAR and TASC scales as revealed by Chinese boys did not differ from that by Chinese girls in terms of the pattern shape and level. But the sex effect in Puerto Rican group was highly significant related to both the shape and level of the patterns. Puerto Rican girls expressed higher level of test anxiety than the Puerto Rican boys. It was reasoned that the pervasive training of self-restraint and endurance in Chinese children prevented both the male and female Chinese from unreluctantly manifesting the anxiety experience while the Puerto Rican girls were thought freer from the defensive mechanism to admit fear than the boys.

Of the five constituents in Gumpgookies, the patterns from different sexes failed to differ significantly in terms of shape or level within Chinese or Puerto Rican sample. The

non-significant result, however, lent support to the previous finding investigating the sex effect upon the five responses in Gumpgookies.

Multiple correlation with achievement performance. The step-down F values showed that the combination of the three motivational variables correlated significantly with reading and arithmetic scores for both Chinese and Puerto Rican samples. The relationship between the predictor and predicted variables was evidently stronger in Puerto Rican group than Chinese group. The high reading proficiency in Chinese pupils was motivated by the high motivation to achieve and less fear for failure while their arithmetic ability was associated with their internal control and test anxiety level. To achieve high reading and arithmetic scores, the Puerto Ricans were expected to acquire the internal orientation as behavioral responsibility and the covert responses in Gumpgookies. The Chinese tended to respond to the IAR questions and certain items in Gumpgookies in the same manner and hence caused either of the scales redundant in the regression analysis. The exceptionally high test anxiety in the Puerto Rican group was deemed overstated, especially by the female students. Yet, with the present data, the overall motivation-achievement relationship was determined and the different relation patterns were evident between the two cultures in terms of the association strength of the motivational correlates with the behavioral criteria.

When the five factors in Gumpgookies were used as predictors, the multiple correlation was not significant with either Chinese reading or arithmetic. The multiple correlation was significant at .05 level with Puerto Rican reading but not with arithmetic scores. To the Chinese, work-enjoyment factor was meant similarly as instrumental and self-confident factors and somewhat reversely as purposive factor in the bivariate analyses. For Puerto Ricans, the achieving subjects seemed more prone to like school work and realize their own competence while the Chinese who held a purpose tended to achieve more. For the non-significant multiple correlations, three conditions were recognized attributable to the results: (1) the high intercorrelation among predictors, (2) the inadequacy of the arithmetic criterion measure, and (3) the social desirability factor.

On both observations, the relationship seemed to be stronger with reading than with arithmetic scores. The verbal aspects prevalent in the reading measure and the motivational scales were believed to be the major source for this occasion.

Estimation of regression weights. Independent of influences from other predictors, Gumpgookies made significant contributions to account for Chinese reading and the two criterion measures in Puerto Rican sample. IAR deserved

credit of contribution to determine the variation of Puerto Rican reading and arithmetic ability. TASC, on the other hand, approached to the significant gain of regression weight as related to Chinese arithmetic scores. The relative importance of each variable in terms of predictive efficiency evidently varied depending on what behavioral criterion and sample was involved. The comparatively high level obtained on IAR scale by Chinese and on TASC by Puerto Rican students was considered unrealistic or improper so far as reflecting pupils' learning abilities was concerned.

To the prediction of achievement performance from the five factors in Gumpgookies, the purposive factor in Chinese group and work-enjoyment factor in Puerto Rican sample were found to be significant contributors. The relative importance of contributions made by other predictors was scarcely clear. The weak relation between some factors and the criterion measures pointed to the need for further purification or re-factorization of the responses to Gumpgookies factors based on the students of the two subsamples in the present study.

Estimation of homogeneity of regression. The comparison of the two regression planes generated from the three motivational variables as related to achievement criteria yielded significant likelihood ratios, indicating the regression equations differ from one cultural group to another and differential predictive function exist between the two sets of regression weights because of the cultural influences.

The test of homogeneity of regression planes based on five factors in Gumpgookies revealed significant interaction effect across the two cultures. The five constituents in Gumpgookies, when stepped into the regression, related quite differently to the criterion for Chinese and Puerto Rican children. The mediation of the cultural aspects upon the differential predictive function among the five independent variables was reflected in the homogeneity test of the two regression planes derived separately from the two cubsamples.

Recommendations

If the full utility of one's intellectual potential is the common goal in our socity, the search for ways and means to maxamize one's motivation to achieve is indispensable. This intention necessites not only the understanding of the motivational pattern of a socity but also the relative importance of the significnat determinants of achievement performance in its members. In discussion the influencing role of the cultural characteristics, a distinction has to be made between the development of achievement motives and the formulation of motivational determinants. To encourage the growth of a particular motive in a culture does no always bring about the accompanying motivational

function in determining the achievement variations. Research evidence (Coleman, 1966; Datz, 1967; Zirkel and Moses, 1971) has reported that high motivational levels developed in Negro population did not necessarily correlate with their achievement-related behavior. This poiint was also well demonstrated in the present findings. The high internal control score in Chinese children and the high test anxiety level in Puerto Rican provided little predictive efficiency of their achievement test scores. Further research may be directed to this area to suggest explanation or amelioration of this condition.

An attempt is also made here to interpret some of the interesting findings from this study and suggest some procecedures to deal with the results. For Chinese children, the growth of motivation to achieve and the diminishing of the test anxiety level affected favorably their achievement behavior. The enhancement of their level of motivation to achieve will be important to Chinese children. Previously reaearch (Rotter and Battle, 1963) described that the internally-oriented subjects tended to be more certain of success probability and more realistic toward goal-setting than the externally-oriented pupils. This conceptualization was implicitly reflected in the analysis results of the five covert responses in Gumpgookies, in which the purposive and evaluative factors were found dominating the predictive function of their achievement-related behavior. Therefore, in order to maximize the striving efforts in Chinese children, there seems to be a need for a particular program to train them how to set up a realistic goal to direct their performance and how to truely evaluate their own achievement on the basis of their internalized standard.

For Puerto Rican children, the strengthening of their internal control level and heightening their motivation to achieve were found paralled with their academic growth. The emphasis of the growing of these two motives is obvious for the Puerto Rican pupils. The impractically high test anxiety attained by this group did not appear in their actual achievement efforts. Research evidence (Hill, 1966; Weiner, 1969) showed that the high anxious subjects tended to perform worst in a failure-threatened situation, with no social reinforcement, and on a difficult task than otherwise. Hill (1966) added that the success experience and positive social reinforcement procured anxiety-reducing property when operating with high anxious pupils. The present finding on the analysis of the five constituents in Gumpgookies also revealed that the high scorers in work-enjoyment, evaluative, and self-confident factors achieve better performance in the Puerto Rican group. To put all these data together brought forth a very interesting generalization that the Puerto Rican children with spuriously high test anxiety needed to strengthen their affection toward school learning, their awareness of their own competence, and their confidence in activity compet-

ition. Based on this empirical evidence, the strengthening of these covert responses may possibly come about through an educational program which enables the Puerto Rican children to experience more successes, receive more positive reinforcement, and work in a low stress situation and on a less difficult task. The obtainment of success experiences and positive reinforcement seems to be the most important means to raise the achievement efforts from the Puerto Rican children.

Therefore, the multivariate analysis of motivational patterns and of the motivation-achievement relationship in different cultures not only justifies the theoretical orientation of the multidimensional model of motivation but also lead to a better description of human motivational structure.

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Sample Distribution According to Sex, Grade Level, and Culture

Grade Level	School	Chinese			Puerto Rican		
		Boys	Girls	Total	Boys	Girls	Total
2nd Grade	A	11	9	20	11	7	18
	B	7	7	14	4	8	12
	C	13	11	24	13	14	27
3rd Grade	B	5	7	12	9	9	18
	C	14	15	29	13	11	24
Total		50	49	99	50	49	99

Sample Distribution According to Age and Culture

Age	Chinese group	Puerto Rican group
7	56	53
8	37	38
9	6	8
Total	99	99

Sample Distribution According to School Experience in United States Cultural Group

Grade started in U. S.	Chinese group	Puerto Rican group
Kindergarten	89	87
1st grade	7	6
2nd grade	3	6
Total	99	99

Sample Distribution According to Language Used at Home Cultural Group

Home-use Languages	Chinese group	Home-use Languages	Puerto Rican group
Chinese	72	Spanish	68
Chin. & Eng.	26	Span. & Eng.	30
English	1		1
Total	99		99

Sample Distribution According to Birth Place of Parent by Cultural Group

Birth place	Chinese group	Birth place	Puerto Rican group
Hong Kong or China	89	Puerto Rico	92
U. S. A.	10	U. S . A.	7
Total	99		99

Sample Distribution According to Birth Place of Students by Cultural Group

Birth place	Chinese group	Birth place	Puerto Rican group
Hong Kong	33	Puerto Rico	24
U. S. A.	66	U. S..A.	75
Total	99		99

An Overview of the Testing Program

Introduction : Under the direction of Fordham University, the undersigned researcher has derived a research project as a dissertation study. This is a study of motivational patterns involving two cultural groups (Chinese and Puerto Rican). Permission to conduct the research was sought and obtained from the principals of three schools consisting of the population requisit for the study. Your school is one of them and the selection of classes (from grades 2 and 3) bas been made as samples for the testing program. Some pertinent aspects of the testing are presented in the following.

Purpose : The testing program thus designed is to serve the main purpose of the study in revealing the motivation levels and their influence upon academic achievement of early-grade students. It consists of administration of three selected measures of achievement motivation and an achievement test. As strictly required by all authorities concerned, the report of the present study will be done by use of a code system without any identification of school or school personnel.

Measuring Instruments :

1) Gumpgookies -- a non-verbal test designed to measure childfen's motivation to achieve at school. Each item has two alternatives portrayed in pictures and accompanying oral descriptions in story format.
Test time required -- about 30 minutes.

2) Test Anxiety Scale for Children (TASC) -- a test designed to asses anxiety reaction which occur in test situations. Each item requests a "Yes" or "No" response.
Test time required -- 35 minutes.

3) Intellectual Achievement Responsibility Questionnaire(IAR) a test devised to measure children's belief in internal versus external reinforcement responsibility for success or failure experience in achievement situations.
Test time required -- 35 minutes.

4) Metropolitan Achievement Tests (MAT) (reading and arithmetic subtests only) -- a test measuring reading skills and comprehension, arithmetic concepts, computation and problem solving.
Test time required -- 2 sessions of 45 minutes.

Sample : All the students in the selected classes will be included in the testing program.

Testers : Gumpgookies will be given by an experienced test with special training on this measurement.

TASC and IAR will be given by a Spanish bilingual tester and a Chinese bilingual tester to the group of the same ethnic background.

MAT (reading and arithmetic subtests) will be given by the homeroom teachers.

Procedures:

1) Gumpgookies will be planned to be given on the first day in the integrated classroom. It will be administered orally in English language by an experienced tester. When will be the suitable testing period for each class will be decided by each teacher by filling in the testing schedule prepared with time slots.

2) TASC and IAR will be given either on the second or the third day. The administration of both measurements will be done in two languages (English and source language) by a bilingual tester. Arrengement of students of same cultural background into homogeneous grouping from neighboring classes will be very desirable for the testing procedure because this will have the advantage of providing two classes of homogeneous groups handled simultaneously by two bilingual testers in the same testing period. Testing schedule is also prepared for the teachers to fill in.

3) Metropolitan Achievement Tests will be given in the integrated setting on the last two days of the program. The administrative procedure written in the test manual will be followed.

Time and Date : The entire testing program requires five sessions of 40-45 minutes scheduled on the last two weeks in June.